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# The Architect Trdat

## Building Practices and Cross-Cultural Exchange in Byzantium and Armenia

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The Armenian architect Trdat is known to historians of both Byzantine and Armenian architecture because of the bicultural nature of his works: he is credited with the repair of the dome of the Hagia Sophia in Constantinople, as well as with the construction of Ani Cathedral in Armenia (989–1001), one of the best-known medieval monuments of the Caucasus.<sup>1</sup> As a highly regarded builder in Armenia, Trdat was also entrusted with the construction of the patriarchal cathedral of Argina (ca. 985) and the palace chapel of King Gagik II (ca. 1001–5). The main churches at the monasteries of Marmašen, Sanahin, and Halpat, all from the second half of the tenth century, have also been attributed to him. Such high-level projects earned Trdat unusual celebrity, and he is one of the few medieval architects mentioned by name in contemporary sources.

However, the body of literature on this figure is, perhaps predictably, asymmetrical. Armenological studies tend to focus on his building projects at home, mentioning his efforts at the Great Church only in passing.<sup>2</sup> Scholars of Byzantine architecture, although cognizant of his activity in the capital, often neglect his constructions in Armenia; some seem unaware that he enjoyed a career there at all.<sup>3</sup> This historiographical bifurcation, the result of both the divergent character of the Byzantine and Armenian sources and persistent cultural and national myopia, has limited our understanding of the architect.<sup>4</sup>

In exploring the historical circumstances surrounding Trdat's Constantinopolitan commission, I consider what he

may have brought from one culture to another, raising the broader question of how Byzantines and Armenians perceived each other's architectural traditions. This is particularly important given the unique character of medieval Armenian culture, which was linked to not only the Mediterranean but also the Islamic world, and which possessed a literature, language, and Christianity distinct from its Greek neighbors.<sup>5</sup>

A study of Trdat's case also offers critical information regarding medieval building practices. Clues to his design process and on-site construction methods are furnished in both a contemporary text and surviving monuments. This evidence is particularly significant, for direct commentary on the subject is very scarce in medieval sources.<sup>6</sup> Although largely overlooked hitherto, Trdat's career provides an important resource for the study of both cross-cultural exchange and building practices in medieval architecture. This inquiry, moreover, furnishes some new perspectives on a group of very familiar monuments.

### Trdat and the Hagia Sophia: Textual and Archaeological Data

Numerous Byzantine sources report on the devastation of the earthquake of 989, the collapse of the dome of the Hagia Sophia, and its subsequent repair under Emperor Basil II (r. 976–1025).<sup>7</sup> However, none mentions the builder involved in the rebuilding project; it is in an early-eleventh-century Armenian source, the three-volume *Universal His-*

tory by Step'anos Tarōnec'i, that his identity is offered.<sup>8</sup> In the last volume, the author discusses Byzantine-Armenian relations during the reign of Basil II, and mentions the earthquake in Constantinople and the repair of the Hagia Sophia. After describing the damage done to a number of structures in the city and its vicinity, Tarōnec'i relates the condition of the church: "Even [Hagia] Sophia, the cathedral, was torn to pieces from top to bottom. On account of this, many skillful workers among the Greeks tried repeatedly to reconstruct it. The architect and stonemason Trdat of the Armenians also happened to be there, presented a plan, and with wise understanding prepared a model, and began to undertake the initial construction, so that [the church] was rebuilt more handsomely than before."<sup>9</sup>

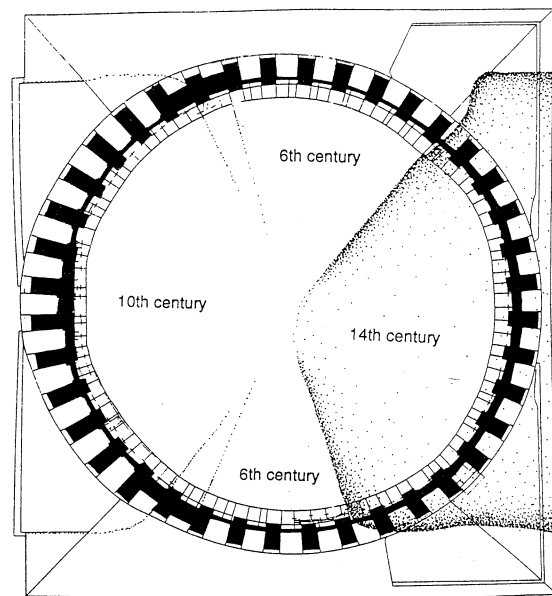
Tarōnec'i's text may contain an element of encomium: after local builders struggle and ultimately fail to arrive at a solution, an outsider conceives and executes—with little evident hardship—a successful repair of the dome. Most interesting in this respect is the use of the verb *dipim* (to happen, to arrive by chance). A literal reading would hence suggest that Trdat happened to be in Constantinople at the time of the dome's collapse, an interpretation running counter to the commonly held idea that he was summoned.<sup>10</sup> The verb may have also been used, however, to emphasize further the casual nature of Trdat's victory over the hapless Byzantine architects. Regardless, for our purposes, the basic units of historical narrative can be set out as follows: Trdat was in Constantinople when the dome collapsed, made preparatory studies of the repair, and undertook the beginning stages of work.

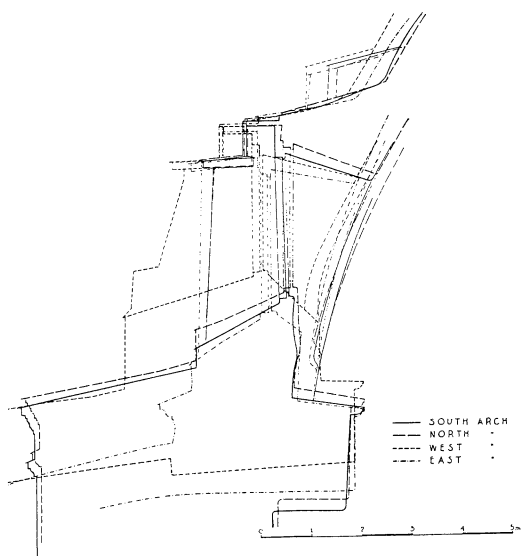
Acquiring more specific information regarding Trdat's interventions has been one of the aims of archaeological surveys by William Emerson and Robert L. Van Nice.<sup>11</sup> In a series of publications from the 1940s and '50s, the two scholars presented the results of their examinations, offering a detailed account of the construction of Hagia Sophia's second dome by Isidorus the Younger and subsequent repairs in the tenth and fourteenth centuries. Although now more than a half-century old, their observations have never been seriously challenged.<sup>12</sup> The scholars located Trdat's contribution based on information from the Byzantine sources and their physical observations of the structure; they concluded that his repair comprised the replacement of the western segment of the dome and the reinforcement of the western arch (Figure 1). First, Emerson and Van Nice noted that in this portion, the radial ribs had been filled in (Figure 2). In place of the ribs is the wall of the dome shell, which runs straight, as does the cornice from which it springs. After inspecting exposed masonry at the interior base of the dome, they concluded that this apparent irregularity was the result of the widening of the great western



**Figure 1** Hagia Sophia, Istanbul, 532–37 and later, view toward the west

**Figure 2** Hagia Sophia, plan of the dome





**Figure 3** Hagia Sophia, diagram juxtaposing the four great arches of the dome. Note that the western arch rises higher than the other three.

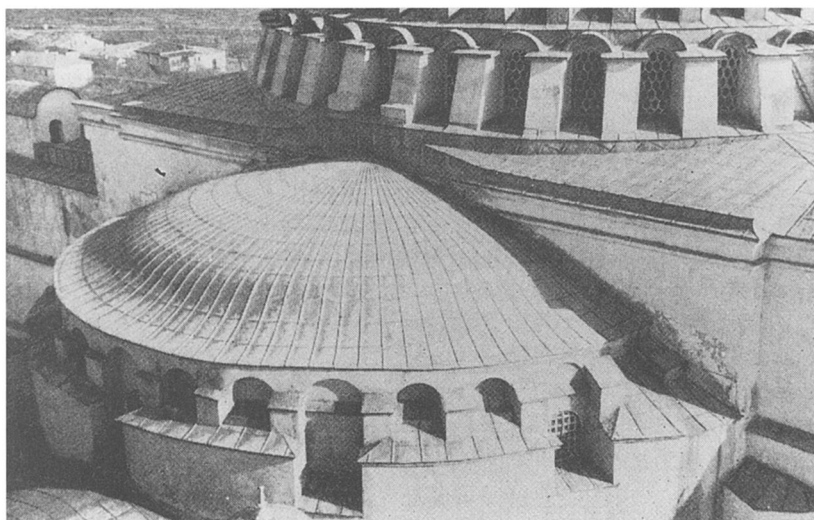
arch, which was built to protrude farther into the dome area than its predecessor (Figure 3). Trdat, the historians believed, also increased the height of the arch, as is evident from the mass that projects above the roofline of the west side of the dome base (Figure 4). This projection, moreover, does not extend straight from corner to corner, but curves inward toward the dome at its center point.<sup>13</sup> Emerson and Van Nice suggested that this inward cambering was intentional<sup>14</sup> and resulted from Trdat's study of the south side of the dome; as it does today, it survived then in its sixth-century state and bore a threatening outward bulge.<sup>15</sup> Hence, they asserted, it is most likely that Trdat intended to safeguard against a similar deformation on the west side.

## The Building Practices of Trdat: Possible Explanations for His Hire

Although the archaeological aspects of Trdat's repair of the dome have been carefully examined, the historical circumstances surrounding it remain unclear. It would be particularly interesting to know how Trdat earned such a prestigious commission, a job for which, as is attested by John Scylitzes, the scaffolding alone cost one thousand pounds of gold.<sup>16</sup> At that point in his career, Trdat had already built a cathedral for the reigning catholicos of Armenia, and it is quite possible that his reputation preceded him. Yet, one would imagine, hiring a local architect would have been more practical.

Additional answers to the question of Trdat's hiring may be sought in the historical context of the late tenth century. Basil II's concern with expanding imperial borders into the Balkans and the Caucasus often kept him from the capital, and, unlike his namesake, Basil I, he is not known to have commissioned any major architectural projects there.<sup>17</sup> Although it is dangerous to draw firm conclusions given the piecemeal nature of the evidence, it is perhaps significant that no monuments from his reign survive in Constantinople.<sup>18</sup> Moreover, Basil's eastward campaigns may have brought him in direct contact with Armenian builders. A number of sources report on Basil's interaction with Armenians; according to the chronicle of Matthew of Edessa, for example, he met with Armenian philosophers during his travels in the Caucasus.<sup>19</sup>

While these factors suggest a scenario in which Trdat was drawn to the capital, they leave a number of problems unaddressed. He was not, most likely, an expert in building Byzantine churches, and the brick and mortar of Byzantine structures constituted a dramatic departure from the stone-



**Figure 4** Hagia Sophia, view of the west face of the dome showing the projecting mass

faced rubble masonry of Armenia and Georgia. Churches of the Caucasus, such as the cathedral of Ani (see Figure 11), were sheathed with thin slabs facing a core of fieldstone and mortar, materials that necessitated a different system of vault construction.<sup>20</sup> Yet if Trdat was not chosen for his mastery of Byzantine materials and techniques, an examination of his repair of the Hagia Sophia also shows little evidence of architectural methods borrowed from the Caucasus. The cladding of Armenian monuments, formed by carefully cut, well-squared stones, would no doubt have struck a Byzantine spectator as distinctive, and hence we might expect to find such masonry in Trdat's repair. As Emerson and Van Nice noted, however, the stonework of the western portion of cornice of Hagia Sophia is marked by a striking lack of uniformity. Unlike the other segments, which feature a consistency in block size, Trdat's portion is composed of varying sizes and shapes.

What, then, recommended Trdat over others for the job? One potentially attractive aspect of Trdat's curriculum vitae was his experience in dome construction, in particular, domes on pendentives, like the Hagia Sophia. Although in Armenia squinches were the more commonly used method of supporting domes, it is noteworthy that, to the best of our knowledge, in all of Trdat's monuments there he utilized pendentives beneath the domes.<sup>21</sup> Another aspect of Trdat's architectural skills is revealed in Tārōnec'i's description of Trdat's election to the job, where he does not offer generic praise but, rather, connects the architect's success directly to the use of preparatory studies. Surprisingly, Tārōnec'i cites not one but two forms: Trdat "presented a plan [*awrinak*], with wise understanding prepared a model [*kalabar*], and began to undertake the initial construction." The term *awrinak*, according to Matthias Bedrossian, is defined as type or model; however, in its secondary meaning, it possesses more precise associations with graphic media, specifically with drawings and plans.<sup>22</sup> *Kalabar*, by contrast, refers to a three-dimensional medium, meaning cast, shape, or mold.<sup>23</sup> Hence we may infer from Tārōnec'i's account that Trdat produced both graphic and plastic studies in preparation for his repair.

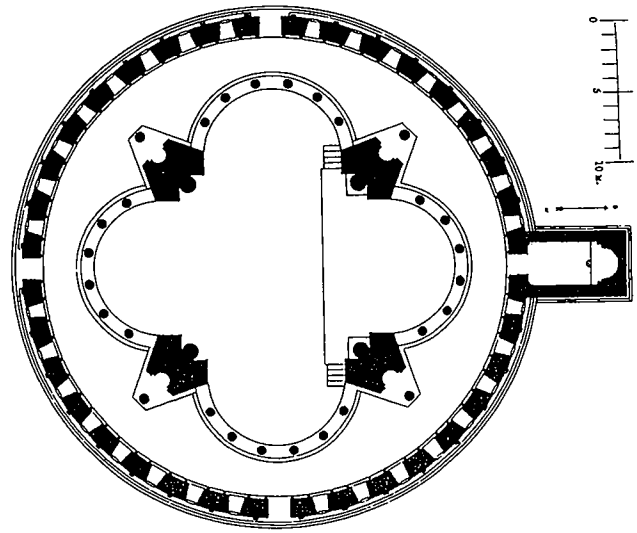
Such a design process finds no parallel description elsewhere in medieval Armenian texts. In the *History of the Armenians* by Agat'angelos, dated to the fifth century, Saint Gregory lays out the foundations of martyria with an architect's line (*lar*): "Saint Gregory himself took up the architect's line and set out the foundations for the saint's chapels of repose."<sup>24</sup> The same phrase is used in the tenth-century *History of the House of the Artsrunik'* to describe the founding of the palace complex at Aht'amar: "Then [Gagik] in his wise understanding, with many artisans took up the archi-

tect's line, to measure and sketch and indicate at the foot of the mountain."<sup>25</sup> This method is also mentioned in the Armenian foundation rite, in which the bishop "takes out the architect's measuring line" to mark the perimeter of the foundation, a practice that suggests the buildings were laid out on-site with ropes, a practice for which Robert Ousterhout has adduced numerous parallels in Byzantium and medieval Europe.<sup>26</sup>

The uniqueness of Tārōnec'i's text may be explained in a number of ways, but it is important to note that the medieval Armenian accounts of the foundation of churches belong to a well-established literary tradition, and the events described above are embedded in a larger hagiographical narrative. In this light, it is significant that the author of the *History of the House of the Artsrunik'* employs precisely the same phrase, "to take up the architect's line," as his fifth-century predecessor. It is thus tempting to assert the veracity of Tārōnec'i's text based on its distinctness from the literary topos and, more particularly, in its use of technical and differentiated terms. But such an assertion must be predicated on a comprehensive analysis of building practices in the medieval Caucasus, which has not yet been ventured, apart from studies of churches in the region of Tao.<sup>27</sup>

However, archaeological and textual evidence can provide a context for Trdat's design practices. With regard to the use of three-dimensional studies, a group of small stone models, dating from the seventh to fourteenth centuries, survive in Armenia and Georgia. Generally ranging in height from one to three feet, they are shaped like the domed, centrally planned churches characteristic of the medieval Caucasus, and occur in a variety of contexts: in addition to their appearance in the relief sculptures of donation scenes, as in the famous example at the tenth-century church of Aht'amar,<sup>28</sup> they also functioned as acroteria, crowning the gables of monastery churches, and reliquaries, as in an example from the monastery of Sanahin.<sup>29</sup> Many of them, though, do not seem to be connected with a particular monument, and hence they have been considered workshop models; one tentatively dated to the seventh century and found in the region of Sisian is currently held in the State Museum of Erevan (Figure 5).<sup>30</sup> In view of the very schematic form of the representatives of this group, it is doubtful that they would have aided much in the design process—it is more likely that such models were used for the purposes of presentation.<sup>31</sup> In any case, this corpus of sculpture, which finds no parallel in Byzantium, suggests that architectural model-making was a familiar concept in the Caucasus.

Trdat's use of drawings may also be situated within a Transcaucasian architectural tradition, as demonstrated in



**Figure 5** Stone church model found in Sisian, Armenia, seventh century (?)

**Figure 6** Church, Gagkašen, Armenia (present-day northeast Turkey), ca. 1001–5 (collapsed), plan

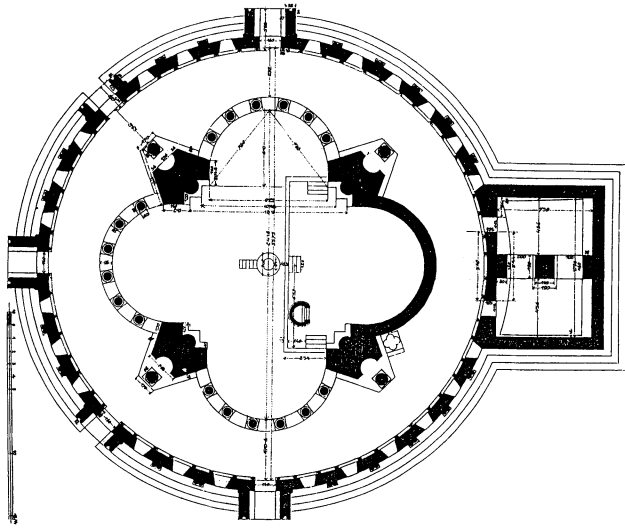
the church of Gagkašen in Ani, Armenia (Figure 6), an early-eleventh-century structure attributed to the architect.<sup>32</sup> As is attested by Tarōnec'i, it is built in imitation of the seventh-century church of Zuart'noc', in Armenia (Figure 7).<sup>33</sup> Both monuments are in ruins; however, even in a study of ground plans, the similarity of Gagkašen to its prototype is readily apparent.<sup>34</sup> The buildings feature double-aisled tetraconch plans with four large, W-shaped piers and exedrae of six columns. Both also share almost precisely the same measurements in overall dimensions and the relationship of components.<sup>35</sup> As Ousterhout has observed, these similarities strongly suggest that Trdat imitated Gagkašen with the aid of a drawing.<sup>36</sup> Additional evidence for the use of plans in Armenia can be adduced: in a recent publication, Armen Ghazarian and Ousterhout brought to light a diagram of a muqarnas vault that was inscribed on the walls of the thirteenth-century Armenian monastery.<sup>37</sup>

Medieval Georgia also offers evidence for the use of drawings: the eleventh-century source Eprem Mcire relates that Nino, the Georgian illuminator, drew the plan of a church that was then built by architects and masons.<sup>38</sup> In the biography of Serapion of Zarzma, Basil Zarzmeli likewise wrote that Serapion traced the plan of a church and gave it to the architect Michael and his assistant for execution.<sup>39</sup> Visual evidence for the practice of using drawings

can be found at the tenth-century Georgian church of K'orogo, in which a sculpted capital depicts the donor holding a plan of the building.<sup>40</sup>

Such evidence for the conceptualization of architecture does not seem to find a parallel in contemporaneous Byzantium. As Ousterhout has argued, Middle Byzantine architects more commonly relied on practical experience rather than theoretical training, a position that is suggested in part by the tenth-century *Poliorcetica*, a military treatise on war machines.<sup>41</sup> Its author, Heron of Byzantium, drew from a Roman source but made significant changes to the original text, removing, for example, the technical vocabulary, which, he explains, would be unfamiliar to the reader. Heron also redrew the two-dimensional classical diagrams as realistic three-dimensional illustrations, a change, Ousterhout asserts, that suggests his audience was unaccustomed to dealing with diagrams or working drawings.<sup>42</sup>

What explains the seemingly divergent approaches to building in Byzantium and the Caucasus? Ousterhout posits differences in building materials: the cut-stone masonry of Armenian and Georgian churches would have required more planning than the brick-and-mortar structures of Byzantium, in which adjustments could be made (and concealed) during the process of construction. It is certain that Trdat's use of plans and models may be situated within a



**Figure 7** Church, Zuart'noc', Armenia, ca. 640–61 (collapsed), plan

regional tradition, and his conceptual expertise would have been particularly appealing to his employers, who were confronted with the repair of an architectural hapax like the Hagia Sophia.

A survey of the Hagia Sophia itself, however, suggests that a third aspect of Trdat's experience was also called into use. Emerson and Van Nice observed a series of readjustments to the setting lines of the dome in the repaired area. At the south end of the repair is a circular groove near the lip of the cornice, concentric with the pendentive below.<sup>43</sup> At the northern end, however, there is no such groove; rather, the lip of the cornice is concentric with the rim of the pendentive. Based on this lack of uniformity, the scholars suggested that Trdat began by setting the stones of the southern segment of the cornice first, and inscribing a curve on them for the ribs above; at the north end, however, he simply designed the cornice itself to indicate the curve of the dome. Hence it appears that Trdat adjusted his methods as he went along.<sup>44</sup>

From the archaeological and textual sources, we may infer that Trdat was proficient in the theoretical planning of the repair while also capable of negotiating with what must have been an unpredictable on-site construction process. I propose that in addition to his reputation as a high-level builder in Armenia, some or all of the skills discussed above were evident to his Byzantine employers and perhaps earned him a supervisory position as master builder, or *pro-maistor*, of the project.<sup>45</sup> What is certain is that his work has endured the test of time—the western segment of the dome has stood for more than a millennium.

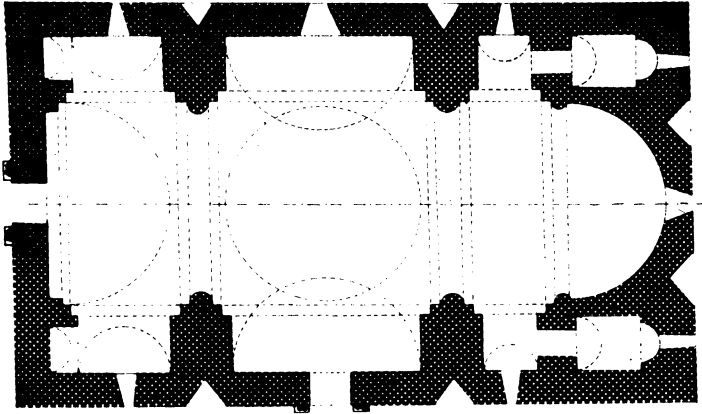
## Trdat in Armenia

Trdat was active in Armenia both before and after his repair of the Hagia Sophia. He is mentioned in connection with Argina (now Ergine), a fortified town north of the city of Ani.<sup>46</sup> In the ninth century, the seat of the catholicos was transferred there from Vaspurakan, and several buildings were erected, including a cathedral. According to the *Universal History*, it was built by Trdat: in an account of the foundation of Ani Cathedral, Tarōnec'i named "the architect (*čartarapet*) Trdat, who constructed the cathedral of Argina."<sup>47</sup> Elsewhere in the text, Tarōnec'i related that Argina Cathedral was built in 985 at the behest of catholicos Xaç'ik (r. 972–92). We may thus conclude that Trdat constructed the monument in 985, before his visit to Constantinople.

The cathedral of Argina, which stood partially ruined since the early twentieth century, collapsed completely in 1966.<sup>48</sup> However, documentary photographs reveal that it was an aisleless, longitudinal structure crowned by a dome on pendentives (Figures 8, 9). The exterior was punctuated by pairs of triangular niches, a common feature of Armenian and Georgian architecture, which indicate the main divisions of the interior. On the inside, the longitudinal space was divided into three bays by thick bundled piers, which formed, at their summit, rib arches for the vaults. In the central bay, the arches were slightly pointed and once provided support for the pendentives, drum, and dome. The semicircular apse at the east was flanked by two small side chapels, and the triumphal arch was articulated by a series of three ribs supported on bundled shafts.<sup>49</sup> Such rich profiling gave the interior a strikingly muscular effect and an emphasis on linearity, which anticipated Trdat's work at Ani Cathedral.

Probably owing to such a high-status commission, Trdat was hired by King Smbat II in 989 to build a cathedral in the city of Ani, in present-day northeast Turkey.<sup>50</sup> According to an inscription on the south wall, construction was interrupted by the death of Smbat in 989, was subsequently resumed by Queen Katramide, the wife of Smbat's brother and successor, Gagik I, and was concluded in 1001. How much of the building was completed at the time of Smbat's death is a matter of debate.<sup>51</sup> Moreover, it is not known under what circumstances Trdat left the project and traveled to Constantinople.

For the present purpose, however, it is more important to observe the physical features of the structure. Currently in precarious condition, the cathedral employs in its general outlines the form of seventh-century, centrally planned basilicas in Armenia (Figure 10).<sup>52</sup> Constructed of rubble masonry, the monument once bore a dome with a conical roof, which was still extant in the nineteenth century.<sup>53</sup>

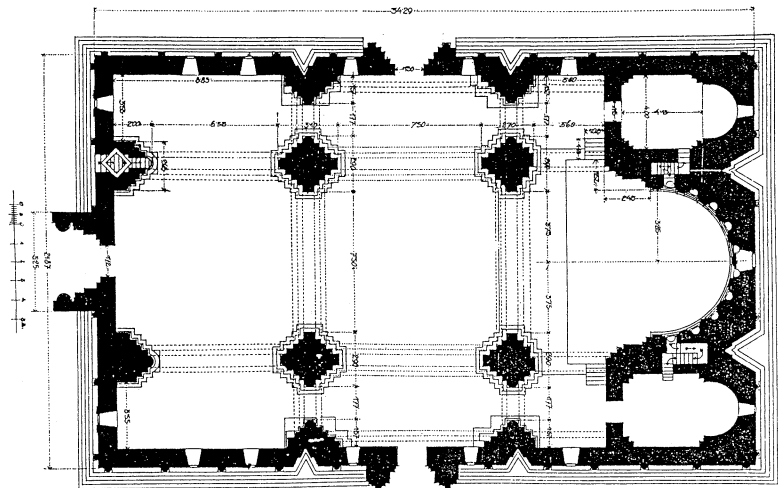


**Figure 8** Argina Cathedral, Armenia (present-day northeast Turkey), ca. 985 (collapsed), plan

**Figure 9** Argina Cathedral (collapsed), view from the west



**Figure 10** Ani Cathedral, Armenia (present-day northeast Turkey), 989–1001, plan





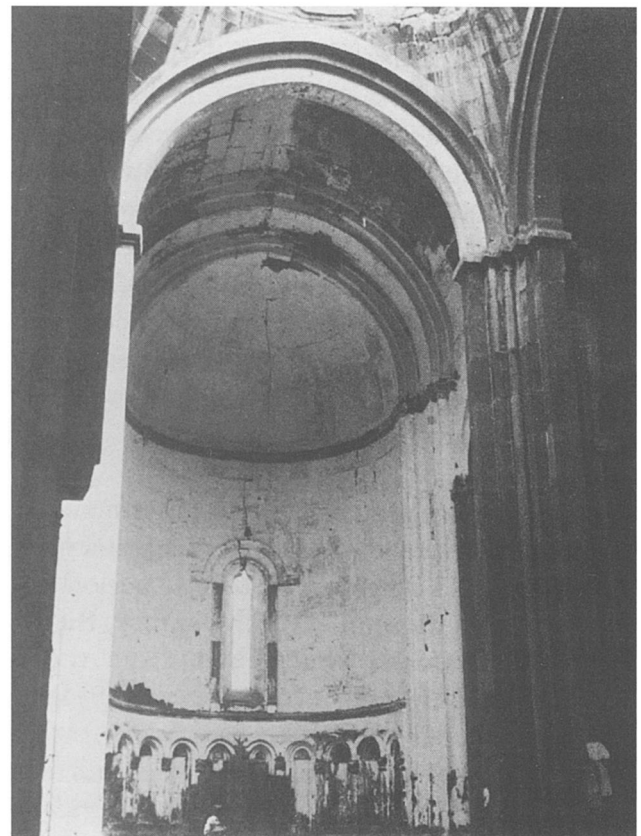


**Figure 11** Ani Cathedral, view from the northwest

Supported on pendentives, the dome stood atop the intersection of four barrel vaults elevated to a cruciform design and topped with gabled roofs (Figure 11). Inside, four massive, freestanding piers divide the space into three aisles, the nave of which terminates in an eastern apse flanked by two-story side chapels (Figure 12).

At Ani Cathedral, Trdat introduced a number of innovations to the architectural scheme of the early medieval domed basilica. As in Argina Cathedral, the vaulting is articulated by a series of pointed rib-arches that spring from profiled piers. However, at Ani these supports are thinner and endow the interior with sinuous elegance echoed by the slender blind arcades of the exterior walls. Another departure from seventh-century architecture, which has been observed by many scholars, is the enlarged space under the dome. Although the structure bears the same general layout as the domed basilica of Mren, at Ani the four main piers stand much closer to the lateral walls, so that the ratio of the width of the side aisle to the domed area is roughly 1:2.<sup>54</sup> At Mren, these widths are almost equal.

It is generally believed that Trdat worked on the church of Gagik I, or Gagkašen, after Ani Cathedral was completed (see Figure 6).<sup>55</sup> The church was dedicated to Saint Gregory and built in imitation of the church of Zuart'noc' (see Figure 7). However, they were not identical; the colonnettes of the four piers project more emphatically at Gagkašen



**Figure 12** Ani Cathedral, view of the interior

than at Zuart'noc', creating, as at Ani and Argina, a greater sense of linearity. Also, Trdat replaced the solid eastern apse at Zuart'noc' with a fourth exedra, which opens out into the ambulatory. Finally, while the architect retained the measurements of the central space (approximately twenty-five meters in both buildings), he decreased the width of the ambulatory from four meters (taken at the outermost curve of the exedrae) to about two and a half. As at Ani Cathedral, the layout allots greater space to the area under the dome. These monuments suggest two elements of Trdat's architectural aesthetic: linearity created by the profiling of the supports and arches, and larger central spaces.<sup>56</sup>

## A Comparative Study

Having surveyed the campaigns of Trdat in Constantinople and Armenia, it is important to consider whether his experiences in one tradition shaped his involvement in the other. It is difficult to imagine how Trdat would have remained unaffected by the interior of the Hagia Sophia, which has overwhelmed visitors since the sixth century, and how an architect working on high platforms within the church could not have been inspired by one of the most impressive domed spaces ever built. In this light, we might perceive the new, larger proportions of the central areas at Ani Cathedral and the church of Gagkašen as a reflection of Trdat's memory of the vast continuous spaces of the Hagia Sophia.<sup>57</sup> The open eastern exedrae at Gagkašen may also be construed as a response to the Hagia Sophia, whose inner core is obstructed nowhere by solid wall, but screened by piers, columns, and exedrae.

Conversely, it is hardly likely that Trdat discarded his experience with Armenian architecture when he stepped into the Hagia Sophia. His arch, which Emerson and Van Nice describe as "extravagantly thickened,"<sup>58</sup> makes more sense when understood as coming from the world of its maker; Armenian buildings were typically more massive, with thicker walls, lower profiles, and fewer windows than their Byzantine counterparts. Perhaps it is for this reason that Trdat decided not only to strengthen the great western arch, but also to alter an adjacent part of the surviving sixth-century dome: according to the archaeologists, the architect filled in two pairs of windows at either end of his segment.<sup>59</sup> Anxiety about these openings is more understandable when we consider that the drum windows of tenth- and eleventh-century Armenian churches, such as the Church of the Savior in Ani, were quite narrow and often alternately blind.<sup>60</sup> Finally, the cornice at the Hagia Sophia may also refer to Armenian building practices. While the north, east, and south segments were constructed

to slope downward, Trdat's cornice extends parallel with the ground (see Figure 3). Emerson and Van Nice referred to this feature as "an irregularity";<sup>61</sup> yet we should remember that it is standard in medieval Armenian building, as is illustrated by the dome cornice of the main church at the tenth-century monastery of Marmasen.<sup>62</sup>

In the end, it is the great disparity in Trdat's Byzantine and Armenian work that stands out. The Hagia Sophia, after all, was not rebuilt with a conical roof, nor was Ani Cathedral constructed of bricks and mortar, and this divergence is one of the most important and intriguing aspects of Trdat's oeuvre. We may wonder how Trdat negotiated between two very different professional and technological milieus, how he interacted with Greek builders, and how he was regarded by them. While answers to these questions may elude us at present, a comparative study of Trdat's career offers a chance to explore broader issues of cultural exchange between Byzantium and Armenia in the tenth and eleventh centuries. It is only a matter of venturing across the border.

## Notes

Versions of this paper were read at the "Conference on the Historic Armenian Province of Ani/Kars," UCLA, 8 November 2001, and at the symposium "The Return of the Dome: Ideas on the Study of History," Princeton University, 11 May 2002. In addition to the audiences at each meeting, I wish to thank Robert Ousterhout, Zeynep Çelik, Slobodan Ćurčić, Bissera Pentcheva, and Anthony Cutler, who first encouraged me to explore the topic.

1. It is generally accepted that the same Trdat undertook both works. However, it is worth laying out the evidence. An architect named Trdat is mentioned in two sections of Step'anos Tarōnec'i's *Universal History*: once in relation to the Hagia Sophia, and later in connection with the cathedrals of Argina and Ani. Although it is conceivable that Tarōnec'i was writing about two different Trdats, the argument for a single individual is much more inviting for many reasons. First, the Trdat responsible for the cathedrals of Argina and Ani was already a noted builder in Armenia prior to the collapse of the dome of the Hagia Sophia; it is certain that he constructed the patriarchal cathedral of Argina prior to 989, and most likely had begun work on Ani Cathedral as well. Hence, he would have been of the appropriate status for an imperial project. Second, an inscription on the south wall of Ani Cathedral indicates that Smbat II died in 989 and that construction was completed in 1001 under Queen Katramide. The death of Smbat could have created a hiatus in building precisely when Trdat was allegedly in Constantinople. Finally, it seems doubtful that two high-level architects working in tenth-century Armenia named Trdat would be mentioned in the same source without differentiation. Armenian chroniclers of the era (like their Byzantine counterparts) rarely mention the names of architects (the case of Manuel, the architect of Alt'amar, is one of the few exceptions). In this regard, it is noteworthy to consider Hracey Acarean's *Dictionary of Armenian Proper Names (Hayoc' Anc'nanumeri Bararan)* (Beirut, 1972), a five-volume reference culled from classical and medieval sources. The name "Trdat" appears only once in the tenth century.

2. To my knowledge, there is only one monograph on Trdat: Kevork

Hovhanēsyān, *Trdat Čartarapet* (The architect Trdat) (Erevan, 1951). Reference articles include Karnik Šaxyan, “Trdat,” *Haykakan Sovetakan Hanrakitaran* (Armenian-Soviet encyclopedia) (Erevan, 1986), 93; and Lucy Der Manuelian, “Trdat,” in Joseph R. Strayer, ed., *Dictionary of the Middle Ages* (New York, 1982), 164–65. Discussions of some length also appear in: Sedrak Barxudaryan, *Mijnadaryan Hay Čartarapetner ev K'argorc Varpetner* (Medieval Armenian architects and stone masons) (Erevan, 1963); T'oros T'oramanyan, *Nyut'er Haykakan Čartarapetut'yan Patmut'yan* (Materials for the study of Armenian architecture), 2 vols., ed. Hovsep' Orbeli (Erevan, 1942–48), 68, 74, 275, 276, 385; Josef Strzygowski, *Die Baukunst der Armenier und Europa* (Vienna, 1918), 590–95; Sirarpie Der Nersessian, *The Armenians* (New York, 1970), 108–10; and Jean-Michel Thierry and Patrick Donabédian, *L'Art arménien* (Paris, 1987), 484. The Armenologist Garbis Armen's *An Architecture of Survival* (Watertown, Mass., 1992), 47–50, attempts to elaborate on Trdat's efforts in Constantinople; however, the author makes the assumption that Trdat reconstructed the entire dome, and hence attributes to him the “innovations” of the pier buttresses and the dome ribs. These elements had been added in the sixth century with the second dome of Isidorus the Younger.

3. For example, William Emerson and Robert L. Van Nice, whose studies of Trdat's repair of the Hagia Sophia are discussed below, make no mention of his Armenian constructions. There are exceptions: Cyril Mango and Richard Krautheimer cite Trdat's work in Armenia, although they focus on his activities in Byzantium. See Cyril Mango, *Byzantine Architecture* (New York, 1985), 130; and Richard Krautheimer and Slobodan Ćurčić, *Early Christian and Byzantine Architecture* (Harmondsworth, England, and New York, 1986), 330. Trdat's works in Armenia are also discussed briefly in Robert Ousterhout's *Master Builders of Byzantium* (Princeton, 1999), 56, 273, n. 49.

4. For further discussion of the problem of nationalist ideology in the literature on Armenian architecture, see Christina Maranci, *Medieval Armenian Architecture: Constructions of Race and Nation* (Louvain, 2001).

5. The best English-language survey of medieval Armenian culture to date remains Nersessian, *The Armenians*.

6. As Ousterhout has shown in *Master Builders of Byzantium*, chronicles, military treatises, and especially saints' lives offer important and overlooked resources for this line of inquiry (59).

7. Byzantine sources that mention the earthquake include Leo Diaconus, John Scylitzes, and Glycas. The episode is also mentioned in an Arab text by Yahya-ibn-Sa'id. The Armenian account of Step'anos Tarōnec'i is discussed below. For a complete list of texts, analyses, and further references, see Cyril Mango, “Byzantine Writers on the Fabric of Hagia Sophia,” in Robert Mark and Ahmet S. Çakmak, eds., *Hagia Sophia from the Age of Justinian to the Present* (Cambridge, England, and New York, 1992), 54; and Mango, *The Mosaics of St. Sophia at Istanbul*, *Dumbarton Oaks Studies* 8 (Washington, D.C., 1962), 77.

8. Tarōnec'i was active in the early eleventh century. Otherwise known as Asohik, the author came from the province of Tarōn, southwest of Lake Van (present-day southeast Turkey), and was appointed by the catholicos Sargis (r. 992–1019) to supervise monasteries and churches. It was Sargis who commissioned Tarōnec'i to write *Universal History*, a three-book account that begins with lists of biblical kings and proceeds in the second and third books to name rulers of Byzantine, Sassanian, and Islamic empires. The critical edition of the text remains Step'an Malxasean, *Step'anos Tarōnec'woy Patmut'wn Tiezerakan* (The universal history of Step'anos Tarōnec'i) (St. Petersburg, 1885). Several translations exist in French, including Edouard Dulaurier, *Étienne Acogbig de Daron. Histoire universelle*, pt. 1 of the *History* (Paris, 1883); and Frédéric Macler, *Étienne Asolik de Taron. Histoire universelle*, pts. 2 and 3 of the *History* (Paris, 1917, 1920), which is also printed in *Publications de l'école des langues orientales vivantes*, 1st ser., 18 (1920). In German, see Heinrich Gelzer and Albrecht Burckhardt, *Stephanos von Taron. Armenische Geschichte* (Leipzig, 1907). Important secondary studies include Gevorg Abgaryan, “Karceç'yal Step'anos Tarōnec'in Noyñ ink'è Step'anos Tarōnec'i Aso-

hiknē” (The so-called Step'anos Tarōnec'i: The same person as Asohik), *Patma-Banasirakan Handēs* (Historical-philological review) 1 (1962), 210–14. For further references, see Robert Thomson, *A Bibliography of Classical Armenian Literature to 1500 AD* (Turnhout, Belgium, 1995), 202–3.

9. Vasn oroy bazum č'an efew arhestawor čartarac'n Yunac' ar i verstin norogel: Ayl and dipeal čartarapetin Hayoc' Trdatay k'aragorci; tay zorinak šinu-acoyñ, imastun hančarov patrasteal zkałapars kazmacoyñ ew skzbnareal zšineln. or ew gełec'kapēs šinec'aw paycał k'an zarač'inn. Malxasean, *Step'anos Tarōnec'woy Patmut'wn Tiezerakan*, 28, 250–51).

10. See, for example, Nersessian, *The Armenians*, 108. This passage also raises questions about the interruption of building at Ani Cathedral, which I discuss below.

11. See William Emerson and Robert L. Van Nice, “Hagia Sophia, Istanbul: Preliminary Report of a Recent Examination of the Structure,” *American Journal of Archaeology* 47, no. 4 (1943), 403–65; and William Emerson and Robert L. Van Nice, “Hagia Sophia: The Construction of the Second Dome and Its Later Repairs,” *Archaeology* 4, no. 13 (1951), 163–71. See also Rowland Mainstone, *Hagia Sophia: Architecture, Structure and Liturgy of Justinian's Great Church* (London, 1998).

12. For example, the contributors to Mark and Çakmak, *Hagia Sophia from the Age of Justinian*, make use of these surveys with little revision.

13. Emerson and Van Nice, “Hagia Sophia: The Construction of the Second Dome,” fig. 9.

14. The cambering is related to the question of whether the semidomes affected the stability of the main dome; on this issue, see the comments of Rowland Mainstone, in which, based on evidence from Italian and Syrian examples, he affirms that they worked as buttresses; Mainstone, *Hagia Sophia: Architecture, Structure and Liturgy*, 172.

15. Emerson and Van Nice, “Hagia Sophia: The Construction of the Second Dome,” fig. 2.

16. Mango, “Byzantine Writers,” 54.

17. “Basil II,” *Oxford Dictionary of Byzantium*, 1: 261.

18. We may also remember the concomitant construction in mainland Greece, such as the Katholikon of the monastery of Hosios Loukas and the church of the Holy Apostles in Athens. However, the circumstances of the proliferation of monastic foundations outside the capital at this time are complex, involving a number of socioeconomic factors, particularly the rise of privately endowed institutions. For further general discussion, see Mango, *Byzantine Architecture*, 115–16, and Krautheimer and Ćurčić, *Early Christian and Byzantine Architecture*, 373 (see n. 3). For a historical study of this problem, see John Phillip Thomas, *Private Religious Foundations in the Byzantine Empire* (Washington, D.C., 1987).

19. See *Armenia and the Crusades, Tenth to Twelfth Centuries: The Chronicle of Matthew of Edessa*, trans. and comm. Ara Dostourian (Lanham, Md., New York, and London, 1993), 39–47.

20. Discussions of T'alin and of other medieval Armenian monuments can be found in Sirarpie Der Nersessian, *L'Art arménien* (Paris, 1977); Thierry and Donabédian, *L'Art arménien*; *Documenti di Architettura Armena* (Milan and Venice, 1968–present); and Paolo Cuneo et al., eds., *Architettura armena dal quarto al diciannovesimo secolo* (Rome, 1988). The most comprehensive, if problematic, study remains Strzygowski, *Die Baukunst der Armenier und Europa* (see n. 2).

21. These buildings include the cathedrals of Argina, Ani, and Gagkašen, which are associated with Trdat via literary sources. However, the main churches at Sanahin, Hałpat, and Marmašen, which are tentatively attributed to him, also bear pendentives beneath the domes.

22. See Matthias Bedrossian, *New Dictionary Armenian-English* (Beirut, 1985), 762.

23. *Ibid.*, 321.

24. *Agathangelos: History of the Armenians*, trans. Robert W. Thomson (Albany, N.Y., 1976), 297, sec. 758.

25. Thomas Artsruni, *History of the House of the Artsrunik*, trans. and comm. Robert W. Thomson (Detroit, 1985), 356, sec. 294.
26. See Robert W. Thomson, "Architectural Symbolism in Classical Armenian Literature," *Journal of Theological Studies* 30 (1979), 109; and Ousterhout, *Master Builders*, 60 (see n. 3).
27. See Wachtang Djbadze, "The Georgian Churches of Tao-Klarjet'i: Construction Methods and Materials," *Oriens Christianus* 62 (1978), 114–34; and Ousterhout, *Master Builders*, 69–70.
28. See Paolo Cuneo, "Les Modèles en pierre de l'architecture arménienne," *Revue des Études Arméniennes*, n.s., 8 (1971), 201–31, figs. 4, 5.
29. Ibid., figs. 20, 21. This reliquary rests on a lintel above the entrance to the southeast side chapel of the main church. Its presence is particularly interesting since the building has been attributed, albeit tentatively, to Trdat.
30. Ibid., 223–30.
31. See the related discussion regarding the plan at K'orogo in Ousterhout, *Master Builders*, 70.
32. In three copies of Tārōnec'i's manuscript, the account of the building of Gagkašen is written under the heading: "On the Construction by King Gagik of the Church called Saint Gregory in the town of Ani. The master of the church is Trdat." Although it is possible that this is simply a later invention (at least one of the manuscripts dates to the sixteenth century), there is also good reason to believe it is accurate: Trdat's oeuvre, which includes commissions by both Smbat II and Gagik's wife, establishes him as the "court architect" of the Bagratids of Ani in the late tenth/early eleventh century. As Trdat had just completed the cathedral of Ani for Gagik's wife, Katramide, it is not hard to imagine that Gagik would have commissioned him to construct a second church. For discussion of the monument and bibliographical references, see n. 33.
33. Sources for Zuart'noc' include T'oros T'oramanyan, *Zuart'noc'-Gagkašen* (Erevan, 1984); Tiran Marut'yan, *Zuart'noc' ev zuart'noc'atip tačarner* (Zuart'noc' and churches of its type) (Erevan, 1963); Step'an Mnac'akanyan, *Zuart'noc'* (Moscow, 1971); and Varazdat Harut'yunyan, *Zuart'noc'* (Erevan, 1954). See also W. Eugene Kleinbauer, "Zvart'nots and the Origins of Christian Architecture in Armenia," *Art Bulletin* 53 (Sept. 1972), 245–62; Kleinbauer, "The Aisled Tetraconch" (Ph.D. diss., Princeton University, 1967); and Christina Maranci, "Byzantium through Armenian Eyes: Cultural Appropriation and the Church of Zuart'noc'," *Gesta* 40, no. 2 (2001), 105–24.
34. The relationship of the almost identical plans of Zuart'noc' and Gagkašen presents an interesting counterexample to prevalent scholarly theories regarding medieval copies. On this issue, see the seminal article by Richard Krautheimer, "Introduction to an 'Iconography of Mediaeval Architecture,'" *Journal of the Warburg and Courtauld Institutes* 5 (1942), 1–33.
35. For example, in both cases the exedrae, measured from the centerpoints of the piers, are exactly fifteen meters. The diameters of the entire inner cores are also equal, measuring twenty-five meters from the centers of the north and south exedrae. However, the ambulatories, discussed below, are of different widths.
36. Ousterhout, *Master Builders*, 273 n. 49.
37. See Armen Ghazarian and Robert Ousterhout, "A Muqarnas Drawing from Thirteenth-Century Armenia and the Use of Architectural Drawings during the Middle Ages," *Muqarnas* 18 (2001), 141–54.
38. Djbadze, "Georgian Churches," 116 (see n. 27).
39. Ibid.
40. See Djbadze, "Georgian Churches," 116, fig. 1; and Ousterhout, *Master Builders*, 70, fig. 43.
41. See Ousterhout, *Master Builders*, 65–66; Denis Sullivan, ed., *The Poliorcetica of Heron of Byzantium: Text, Translation, and Commentary* (Washington, D.C., forthcoming); Denis Sullivan, "Originality in the Poliorcetica of 'Heron' of Byzantium," *Byzantine Studies Conference, Abstracts* 18 (1993), 32–33; and Carle Wescher, *Poliorcétique des grecs* (Paris, 1867).
42. Ousterhout, *Master Builders*, 65–66.
43. Emerson and Van Nice, "Hagia Sophia, Istanbul," fig. 11 (see n. 11).
44. Emerson and Van Nice, "Hagia Sophia: The Construction of the Second Dome," 167–68 (see n. 11).
45. For a discussion of project supervision in the Byzantine world, see Ousterhout, *Master Builders*, 46–49.
46. The site was in the possession of the Armenian Kamsarakan dynasty until the seventh century, when it was conquered by the Persians. In the following century, it passed into the hands of the Bagratids.
47. Arkanē himn ew mecasēn ekelec'yn i noyn k'ałak'in Anioy i jern čartarapetin Trdatay, or zkat'olikosaranin ekelec'in sineac' yArkinay. Malxasean, *Step'anos Tārōnec'woy Patmut'wn Tiezerakan*, 11, 187.
48. The complex at Argina also included the residence of the patriarch. For further discussion of the cathedral, see *Armenian Architecture: A Documented Photo-Archival Collection on Microfiche for the Study of Armenian Architecture* (Zug, Switzerland, 1980–90) 6, fiche A-2200, C7–C8; Strzygowski, *Die Baukunst der Armenier und Europa*, 194, 590–91, 699 (see n. 2). For a more recent discussion, see Cuneo, *Architettura armena* (see n. 20).
49. Surviving decoration includes the sculpture of the pier capitals, which featured an interlace design typical of the period.
50. It is rivaled in fame perhaps only by the palace chapel of Alt'amar on Lake Van, which also dates to late tenth century. Sources for the cathedral are more abundant than can be listed here; a basic introduction to the site as well as references for further reading are provided in "Ani," *Documenti di Architettura Armena* (1984) (see n. 20); Nersessian, *L'Art arménien*, 101, 106, 107, 163 (see n. 20); and Thierry and Donabédian, *L'Art arménien*, 123, 167–69, 598 (see n. 2).
51. The construction period may have extended until 1010. For a summary of the positions on this debate and an argument for its conclusion in 1001, which is generally accepted, see Tiran Marut'yan, "When Was Ani Cathedral Constructed?" *Armenian Review* 43, no. 4 (1990), 95–110.
52. Recent dynamite blasts in the region have caused the northwest corner of the structure to topple, leaving the monument in imminent danger of complete collapse.
53. This is verified by H. Ep'rikan in *Armenian Architecture* 6, fiche A-2161, B1–B3.
54. See Mango, *Byzantine Architecture*, 106, fig. 150 (see n. 3).
55. For the church of Gagkašen, and particularly its relation to Zuart'noc', see T'oramanyan, *Zuart'noc'-Gagkašen* (see n. 33). Further studies include Kleinbauer, "Zvart'nots and the Origins of Early Christian Architecture in Armenia," 254–56 (see n. 33); Thierry and Donabédian, *L'Art arménien*, 485; Cuneo, *Architettura armena*; and "Ani," *Documenti di Architettura Armena* (1984).
56. See, for example, the comments of Nersessian, *L'Art arménien*, 101 (see n. 20).
57. In the case of Ani Cathedral, however, this hypothesis must remain extremely tentative, since we do not know how much was built before Trdat went to Constantinople.
58. Emerson and Van Nice, "Hagia Sophia, Istanbul," 434 (see n. 11).
59. Ibid.
60. Nersessian, *L'Art arménien*, fig. 68.
61. See Emerson and Van Nice, "Hagia Sophia: The Construction of the Second Dome," 167 (see n. 11).
62. Although the monument is discussed in all the surveys of Armenian architecture mentioned thus far, the most recent study and only monograph is by Gaiane Casnati and Maria Mimmo, *La chiesa di Marmasben. Un progetto di restauro per l'Armenia* (Milan, 1994). It is interesting to note that the cornice of Ani Cathedral is unusual in having a stepped profile. Is this a reflection of the sloping cornices of the Hagia Sophia?

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Figure 1. Robin Cormack, *Byzantine Art* (Oxford, 2000), fig. 15

Figure 2. Robert Ousterhout, “Constantinople, Bithynia, and Regional Developments in Later Paleologan Architecture,” in Slobodan Ćurčić and Doula Mouriki, *Twilight of Byzantium: Aspects of Cultural and Religious History in the Late Byzantine Empire* (Princeton, 1991), fig. 4

Figure 3. Emerson and Van Nice, “Hagia Sophia, Istanbul,” fig. 12

Figure 4. Emerson and Van Nice, “Hagia Sophia: The Construction of the Second Dome,” fig. 8

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Figures 6, 7, 10. Strzygowski, *Die Baukunst der Armenier und Europa*, figs. 122, 112, 222

Figures 8, 9. *Armenian Architecture* 6, fiche A-2200, C10; fiche A-2200, C1

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